

## **manufacturing/remanufacturing optimization problem under carbon tax**

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### **Abstract**

This paper proposes an optimization model for manufacturing and remanufacturing production problem under carbon tax constraint. The production system of this study composed by a manufacturing and remanufacturing units produce one type of product in order to satisfy the random demand under given service level. The two units are subject to random failures and these failure rates are influenced by the variation of production rates. The objective of this study is to determine the optimal production plans of manufacturing and remanufacturing units and the emission carbon amount for each production period by minimizing the total production, inventory, maintenance and carbon tax costs and taking into account the proposed maintenance plan for the remanufacturing machine and respecting the emission tax constraint.

**Keywords:** Failure rates, Optimization, Maintenance, Production, Service level, Tax Carbon.

### **Biography**

**Bouslikhane Salim** is a PHD student in the laboratory of industrial engineering, production and maintenance at the University of Lorraine, Metz. His main areas of research on the optimization of maintenance policies coupled to production and the development of methods and support the design and control tools in the production systems of goods and services.

**Hajej Zied** is an Associate professor at the University of Lorraine, Metz platform since September 2012. It operates research and responsible for the RIAD team in the laboratory LGIPM Metz. After obtaining his doctorate at the University of Paul Verlaine - Metz in 2010, he was employed at the University of Metz as contract research engineer until August 2012. His main areas of research on the optimization of maintenance policies coupled to production and the development of methods and support the design and control tools in the production systems of goods and services. He is the author of numerous articles in international community of industrial engineering. Her teaching areas include modeling and organization of manufacturing and logistics systems, the practice of simulation, automation, and quality system production.

**Nidhal Rezg** is a professor at the University of Lorraine; he is a Doctor of Industrial Automatic from the National Institute of Applied Sciences (INSA) in Lyon in 1996. Accreditation to supervise research at the University of Metz in 2003. he was Professor at the Faculty of Engineering of the University of Moncton, New Brunswick Canada from 1997 to 1999 and Associate professor at the University of Metz until 2004, and currently holds the position of Professor of University. He is director of LGIPM laboratory since October 2006 and scientific responsible of the INRIA CusTom team from 2007 to 2011. His research interest is the optimization of maintenance policies coupled to production, the optimal control SED. He is the author of sixty papers in international journals, directors of 12 theses and 4 Accreditation to supervise research. Keywords researches are modeling, simulation and optimization of stochastic processes, reliability and maintenance and Petri nets.